

Study to Determine the Effectiveness of Mesh Repair in Inguinal Hernia

Asim Shafi^{1*}, Shabbir Ahmed², Umair Tahir³, Rab Nawaz Malik⁴, Abdul Quddus⁵

¹Associate Professor, Department of General Surgery, Bakhtawar Amin Medical and Dental College, Multan, Pakistan. Email: drasim65@hotmail.com,
^{*Corresponding author}

²Assistant Professor, Department of General Surgery, Bakhtawar Amin Medical and Dental College, Multan, Pakistan.

³Senior Registrar, Department of General Surgery, Bakhtawar Amin Medical and Dental College, Multan, Pakistan.

⁴Assistant Professor, Department of General Surgery, Bakhtawar Amin Medical and Dental College, Multan, Pakistan.

⁵Assistant Professor, Department of General Surgery, Bakhtawar Amin Medical and Dental College, Multan, Pakistan.

Abstract

Background: Aim: To assess the effectiveness of mesh repair in inguinal hernias. Study Design: A Prospective Study. Place and Duration: The study was conducted from February 2019 to February 2021 for two-years duration at the Department of Surgery of Bakhtawar Amin Medical and Dental college Multan. **Methods:** A total of 120 patients were included. Inclusion criteria: Patient with clinical symptoms of primary or recurrent inguinal hernia. Exclusion criteria: Patient with other types of inguinal and extra-groin hernia and the patient is too weak to endure surgery. **Results:** In total, 120 patients were operated on and included in the study. During this initial follow-up, it was especially interesting to learn about the self-esteem of patients regarding their physical limitations in the first month after surgery. 81.66% (n: 98) belong to urban areas and 18.33% (n: 22) from the remote areas. Straining during bowel movements and urination was the main predisposing factor to hernia, i.e., 43.33% (n: 52). Other factors contributing to hernia include smoking 20.83% (n: 25), chronic coughing 15% (n: 18), weight lifting 9.16% (n: 11), and obesity 9.16% (n: 11). No contributing factors were identified in three patients. The incidence of the hernia type was first clinically diagnosed and finally confirmed during surgery. 91 patients (75.83%) had an indirect inguinal hernia, 29 patients (24.17%) had a direct inguinal hernia. There were no significant complications during the procedure or postoperative death. There were complications in 42 (35%). They were all managed conservatively. **Conclusion:** Inguinal hernia is very common in men, and Lichtenstein repair can be performed safely, quickly, without stress, with excellent results in surgical departments, fewer postoperative complications, and minimal chance of recurrence.

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INTRODUCTION

The word "hernia" comes from Greek and means "A Bud or Shoot".^[1] A hernia is a protrusion of viscous substance or part of viscous that emerges from an abnormal opening in the walls of the cavity containing it. An inguinal hernia is the protrusion of the abdominal contents from the groin area.^[2,3] It is divided into direct and indirect varieties. The highest rates of hernia operations in the world (280 / 100,000) are 180 and 100 respectively in Australia and the United Kingdom.^[4,5] Inguinal hernias can occur at any age and are predominantly male (20: 1). In general, all hernias should be repaired unless the patient's local or systemic conditions prevent a safe outcome. There are many different techniques for inguinal hernia repair. Regardless of the method used, a meticulous technique is essential.^[4,5] The cornerstone of the modern approach to hernia repair was laid in 1871 with Marcy, and in 1884 with Z Shouldice in 1951. Bassini repair remained the gold standard for hernia treatment until 2002, when Lichtenstein was adopted as the gold standard.^[6,7] Bassini's repair consists in bringing the defect of the posterior abdominal wall, the deep inguinal ring and the approximation of the co-joint tendon closer to the inguinal ligament.^[8] Lichtenstein repair requires a net to be applied to the posterior wall, thus reinforcing it without putting pressure on the posterior wall. The principles of repair are excision or reduction of the hernial sac and repair of the back wall

of the inguinal canal.^[9] The inguinal hernia remains one of the most common general surgical procedures, with about 10 to 20 percent being performed because of a relapse.^[10]

A major problem was relapse after hernia repair. Prosthetic materials are being used more and more in hernia repair to prevent recurrence. Its use has several benefits, such as less post-operative pain, rapid recovery, and a low number of relapses.^[11]

Several specialist hernia centers recommend mesh repair with a recurrence rate of less than 2%. Reviews of specialized hernia centers show that the number of recurrences of mesh repair is 0.2%.

MATERIALS AND METHODS

The study was conducted from February 2019 to February 2021 for two-years duration at the Department of Surgery of Bakhtawar Amin Medical and Dental college Multan.

The inclusion and exclusion criteria were as follows:

- A patient with clinical signs of primary or recurrent inguinal hernia.
- Patients with other types of inguinal and extra-groin hernia were excluded from the study.
- Patients with ASA 4 and 5 were excluded from the study.

All patients were operated on according to the scheduled list. In each case, a detailed interview and detailed physical examination were performed. The pre-operative examination was performed on patients with a complete blood test, complete urine test, and

blood glucose levels. The circulatory and respiratory status of a patient aged over 45 was assessed by means of ECG and chest X-ray. P / R and ultrasound examinations of the prostate were performed to assess the urine status of patients over 50 years of age. All data was saved in the previously designed Proforma.

All operations were performed under spinal anesthesia. Hernias were classified as direct or indirect depending on their anatomical location. Data on postoperative and postoperative complications have been recorded.

Patients were referred to the clinic one week after surgery, and then 1 month, 6 months, 1 and 2 years after surgery in order to detect possible complications of the wound.

Pre-operative preparation included the postoperative shaving area, continuation of I / V antibiotics for 48 hours with induction, and DVT prophylaxis by injection. Clexane 20 mg w / c OD for obese patients. This prophylactic L.M.W heparin was continued until the patient was mobilized. Attention has been paid to the dosing of antibiotics, analgesia and early mobilization in the postoperative period.

Patients were discharged from the hospital after 24-72 hours, when they were painless and without complications. The sutures were removed at the clinic on the eighth day after the operation. The wound and the

groin area were also examined for possible complications.

Postoperative complications in the hospital were defined as early postoperative complications in the first month after surgery, and occurring one month after surgery as late ones.

Patients were advised to continue their daily life after one and a half months with light work recommendations such as office work and hard work.

RESULTS

In total, 120 patients were operated on and included in the study.

During this initial follow-up, it was especially interesting to learn about the self-esteem of patients regarding their physical limitations in the first month after surgery.

81.66% (n: 98) belong to urban areas and 18.33% (n: 22) from the remote areas. Straining during bowel movements and urination was the main predisposing factor to hernia, i.e., 43.33% (n: 52). Other factors contributing to hernia include smoking 20.83% (n: 25), chronic coughing 15% (n: 18), weight lifting 9.16% (n: 11), and obesity 9.16% (n: 11). No contributing factors were identified in three patients. As shown in the [Table 1], the age of the patients varies from 21 to 70 years. The incidence of types of hernias is presented in [Table 2]. There were no significant intraoperative complications or postoperative deaths. There were complications in 42 (35%). All were treated conservatively and are presented in [Table 3].

Table1: Age Distribution of Patients

Age Group	Frequency	Percentage
21-30	37	30.83%
31-40	23	19.17%
41-50	24	20.00%
Above 51	36	30.00%
Total	120	100.00%

Table 2: Type of Hernia

Type of Hernia	Frequency	Percentage
Direct	29	24.17%
Indirect	91	75.83%
Total	120	100.00%

Table 3: Post-Operative Complications

Complications	Frequency	Percentage
Wound Hematoma	8	6.67%
Wound infection	9	7.50%
Seroma	5	4.17%
Testicular atrophy	Nil	--
Urinary Retention	5	4.17%
DVT	Nil	--
Scrotal Edema	8	6.67%
Mesh Infection	Nil	--
Recurrence	Nil	--
Post-operative neuralgia	7	5.83%
Total	42	35.00%

61 patients were discharged in two days, ie 50.83%, 38 (31.66%) in three days and 12 (10%) in four days and 9 (7.5%) patients stayed longer than 4 days for some reason e.g. infection of a wound or being in remote areas.

Follow-up: A follow-up visit was performed in the first week after discharge for one month, six months, the first year, and the second year. Up to two years there was no relapse, and no significant complications related to the operation were observed.

DISCUSSION

The history of inguinal hernia treatment has developed from life-saving strangulation hernias to elective short-term uncomplicated hernia surgery.^[9,10]

In this new era of evidence-based medicine, any hernia repair procedure must be carefully evaluated for its benefits and costs. Benefits must be measured clinically, socially and economically. Benefits are similarly assessed across the patient environment and healthcare system.^[11,12] It is no longer appropriate to show that certain procedures are working. These procedures should be assessed in randomized controlled trials, properly conducted to eliminate collective variables.

The most popular operations among surgeons today are Shouldice, Lichtenstein repair, and laparoscopic methods of transabdominal preperitoneal repair and total retroperitoneal repair.^[13,14]

Shouldice and Lichtenstein repairs have clear advantages as they can be performed under local anesthesia and are characterized by a low rate of postoperative complications and long-term recurrences.^[15]

Lichtenstein repair has the added benefit of being a simpler procedure with a shorter learning curve than Shouldice repair. Lichtenstein repair is currently the most appropriate surgery for primary inguinal hernias. This has an excellent outcome in the hands of non-specialist surgeons and results in

less post-operative pain, early recovery, and a lower relapse rate than suture repair.^[16]

Liechtenstein's basic principles for tension-free hernioplasty mean that the main purpose of a tension-free hernioplasty is to overcome adverse effects such as abdominal pressure gradient and mesh contraction. Drye's analysis on pressure showed an average pressure of 8 cm H₂O in the supine position compared to 12 cm H₂O in the standing position.^[17,18] Various activities such as exercise and vomiting increased the pressure above 80 cm H₂O. According to our laboratory and clinical studies from 2015, after implantation, the mesh shrinks by about 20% in both directions in Klinge et al study 2018.

The following basic principles have been an integral part of Operation Liechtenstein since 1988:

1. Use a large mesh Lichtenstein. The Lichtenstein Institute recommends repairing with a 7.15 cm mesh layer for easy maintenance and then cutting it 3-4 cm to the side.
2. Cross the tails of the net behind the spermatic cord to prevent it from recurrence lateral to the internal ring.
3. Fixing the mesh prevents folding, movement and wadding of the mesh (meshoma), which can cause hernia recurrence and chronic pain.
4. At the stage of the postoperative course, keeping the mesh slightly loosened by the tent or dome-shaped support, the additional dome mesh secures the repair by cushioning the anterior bulge of the transverse fascia

due to intra-abdominal pressure. When the mesh contracts after compression and infiltration of the tissue, this additional mesh compensates for the contraction.

5. Identify and protect the iliohypogastric, ilioinguinal and genital nerves during surgery.

Careful identification and care of the inguinal nerves during hernia repair should minimize the occurrence of chronic pain. Triple neurectomy is a proven surgical procedure for chronic post-operative pain that is not a multidisciplinary treatment for pain.^[19] Simultaneous resection of the ilio-inguinal, ilio-hypogastric and genital nerves is performed with implantation of their proximal ends and without mobilization of the spermatic cord. The reported success rate of the triple neurectomy procedure ranges from 80% to 95%. A study at the Department of Surgery at the University of Salt Lake City, Utah, demonstrated the superiority of an open mesh over laparoscopic mesh repair when complications are detected and recurrence rates are observed.^[20]

A randomized study of Lichtenstein's and Shouldice's hernia repair in the surgical ward of the Swedish Ostursund Hospital found that Lichtenstein's hernia repair is easier to learn, takes less time and has fewer recurrences. Another study conducted at the surgical ward of Hellemi Airforce Hospital in Athens, Greece, found that repairing an inguinal hernia with a tension-free Lichtenstein mesh is a simple, safe, convenient and effective

method with an extremely low recurrence rate.^[21,22]

My study, which is a prospective study, enrolled 120 patients over a two-year period. I couldn't find inguinal hernias recurrence in women during this period, but another study at the Rawalpindi Joint Military Hospital found a male-to-female ratio of 46.5: 1. If we look at the literature, the most common types are bilateral inguinal hernias and indirect hernias. If we compare our relapse rate (0%) after two years of follow-up with an international study by Peter Danielsson et al. In a regional hospital in Sweden, they got the same result, zero relapse rate for one year.^[23] Another study in Queensway, UK, showed the same results over a one-year follow-up period and recommended Lichtenstein repair as the preferred method of inguinal hernia repair because of its high patient satisfaction, minimal complications, and low recurrence rate as 5.3% of the survey. Therefore, the overall recurrence rate is the same over the 12–24-month follow-up period in local and international studies, but there is little difference in the incidence of other complications.^[24]

Inguinal hernia is very common in men. Most patients have more than one risk factor for causing an inguinal hernia. Indirect inguinal hernia is common in young and middle age. Tension-free Lichtenstein mesh repair can be performed safely and is well-tolerated with minimal post-operative pain. The surgical procedure is usually simple. There was a minimum of minor complications after the operation. No

patient required surgery to treat complications. There was no recurrence of this type of therapy during our study. Patients happily accepted this procedure. There is minimal disruption due to returning to normal life early.

CONCLUSION

Lichtenstein repair can be performed in surgical departments that are safe, fast, stress-free, deliver excellent results, have few postoperative complications, and have minimal chances of recurrence. Inguinal hernia repair is much better than mesh repair in terms of relapses and chronic postoperative pain. A 10-year follow-up study provides evidence that mesh repair inguinal hernia is synonymous with meshless repair in terms of long-term persistent pain and discomfort that interferes with daily activity.

REFERENCES

1. Ashley T, Ashley H, Wladis A, Bolkan HA, van Duinen AJ, Beard JH, Kalsi H, Palmu J, Nordin P, Holm K, Ohene-Yeboah M. Outcomes after elective inguinal hernia repair performed by associate clinicians vs medical doctors in Sierra Leone: a randomized clinical trial. *JAMA network open*. 2021 Jan 4;4(1):e2032681-.
2. Liu J, Chen J, Shen Y. The results of open preperitoneal prosthetic mesh repair for acutely incarcerated or strangulated inguinal hernia: a retrospective study of 146 cases. *Surgical endoscopy*. 2020 Jan;34(1):47-52.
3. Liu J, Zhai Z, Chen J. The use of prosthetic mesh in the emergency management of acute incarcerated inguinal hernias. *Surgical innovation*. 2019 Jun;26(3):344-9.
4. Oehme F, Beeres FJ, Fourie L, Okwudili ET, Nussbaumer P. Cost-Effectiveness Analysis of Mesh Repair for Inguinal Hernia During a Humanitarian Surgical Mission in Rural

Nigeria. International Surgery. 2019;104(1-2):2-8.

5. Ielpo B, Nuñez J, Ferri V, Silva J, Quijano Y, Vicente E, Caruso R, Giuliani A, Pellino G. Laparoscopic inguinal hernia repair: cost-effectiveness analysis of trend modifications of the technique. Updates in Surgery. 2021 Mar;3:1-9.
6. Tabiri S, Owusu F, AtindaanaAbantanga F, Moten A, Nepogodiev D, Omar O, Bhangu A. Mesh versus suture repair of primary inguinal hernia in Ghana. BJS open. 2019 Oct;3(5):629-33.
7. Sahebally SM, Horan J, Rogers AC, Winter D. Fixation versus no fixation in laparoscopic totally extraperitoneal repair of primary inguinal hernia—a systematic review and meta-analysis of randomized controlled trials. Langenbeck's Archives of Surgery. 2020 Jun;405(4):435-43.
8. Lin YT, Weng TY, Tam KW. Effectiveness and Safety of Mesh Repair for Incarcerated or Strangulated Hernias: A Systematic Review and Meta-Analysis. World journal of surgery. 2020 Jul;44(7):2176-84.
9. Gulzar MR, Nasir M, Ahmad S, Farooq MU, Aslam F, Tahir S. Cost Effectiveness of Desarda Repair as Compared to Mesh Hernioplasty in Inguinal Hernia. Annals of Punjab Medical College (APMC). 2020 Jun 30;14(2):112-4.
10. Ghanghoria A, Tiwari KS, Mathur RK. Evaluation of efficacy of self-gripping mesh in open and laparoscopic inguinal hernia repair. International Journal of Surgery. 2020;4(2):223-8.
11. Sun L, Chen J, Li J, Shen Y. Randomized and Comparative Clinical Trial of Bovine Mesh Versus Polypropylene Mesh in the Repair of Inguinal Hernias. Surgical laparoscopy, endoscopy & percutaneous techniques. 2020 Feb 18;30(1):26-9.
12. Techapongsatorn S, Tansawet A, Kasetsermwiriy W, McEvoy M, Attia J, Wilasrusmee C, Thakkinstian A. Mesh fixation technique in totally extraperitoneal inguinal hernia repair-A network meta-analysis. The Surgeon. 2019 Aug 1;17(4):215-24.
13. Aiolfi A, Cavalli M, Micheletto G, Bruni PG, Lombardo F, Morlacchi A, Bonitta G, Campanelli G, Bona D. Open mesh vs. suture umbilical hernia repair: systematic review and updated trial sequential meta-analysis of randomized controlled trials. Hernia. 2020 Feb 24:1-9.
14. Greco D, Santori G, Brancato G, Gossetti F, Ipponi PL, Negro P, Gianetta E, Giovannini SC, Mascherini M, Stabilini C. A new semiresorbable mesh for primary inguinal repair: a preliminary observational study on quality of life and safety. Hernia. 2020 Oct;24(5):1019-31.
15. Di Nicola V, Tebala GD. Platelet-Rich Fibrin-Mesh Technique for Inguinal Hernia Repair: Results of a Feasibility Pilot Study. Surgical Technology International. 2021 Jan 25;38.
16. Wani MM, Durrani AM. Cost effective use of mosquito net mesh in inguinal hernia repair. Journal of Biomedical Research. 2019 Sep;33(5):351.
17. Wu F, Zhang X, Liu Y, Cao D, Yu Y, Ma Y. Lightweight mesh versus heavyweight mesh for laparo-endoscopic inguinal hernia repair: a systematic review and meta-analysis. Hernia. 2020 Feb;24(1):31-9.
18. Van Steensel S, van Vugt LK, Al Omar AK, Mommers EH, Breukink SO, Stassen LP, Winkens B, Bouvy ND. Meta-analysis of postoperative pain using non-sutured or sutured single-layer open mesh repair for inguinal hernia. BJS open. 2019 Jun;3(3):260-73.
19. Techapongsatorn S, Tansawet A, Kasetsermwiriy W, Pattanaprateep O, Thakkinstian A. Mesh fixation technique for inguinal hernia repair: protocol for an umbrella review with integrated and updated network meta-analysis. BMJ open. 2019 Oct 1;9(10):e031742.
20. Pradhan R, Pangil A. Use of Mosquito Net Mesh Versus Polypropylene Mesh in Tension-Free Repair of Inguinal Hernia: a 1-Year Randomized Controlled Trial. Indian Journal of Surgery. 2020 Dec;82(6):1063-6.
21. Huynh D, Fadaee N, Al-Aufey B, Capati I, Towfigh S. Robotic iliopubic tract (r-IPT) repair: technique and preliminary outcomes of a minimally invasive tissue repair for inguinal hernia. Hernia. 2020 Oct;24(5):1041-7.
22. Sun L, Chen J, Shen Y. Randomized controlled trial of Lichtenstein repair of indirect inguinal hernias with two biologic meshes from porcine small intestine submucosa. Therapeutics and clinical risk management. 2019;15:1277.
23. Kumar A, Pal AK, Choudhary A, Anand A, Sonkar AA, Pahwa HS. Transfascial suture



versus tack fixation of mesh in totally extraperitoneal repair of inguinal hernia: A prospective comparative study. Journal of minimal access surgery. 2020 Apr;16(2):132.

24. Liu WZ, Qian JH, Shen ZJ, Yang BB, Cheng Y. Fixing tacks induced bladder erosion and recurrent stones following laparoscopic inguinal hernia repair: a case report. BMC surgery. 2020 Dec;20(1):1-4.

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